```
MMM        MMM     AAAAAAAAA         CCCCCCCCCCCC   RRRRRRRRRRR          000000000
MMM        MMM     AAAAAAAAA         CCCCCCCCCCCC   RRRRRRRRRRR          000000000
MMM        MMM     AAAAAAAAA         CCCCCCCCCCCC   RRRRRRRRRRR          000000000
MMMMMM  MMMMMM    AAA      AAA   CCC             RRR        RRR   000          000
MMMMMM  MMMMMM    AAA      AAA   CCC             RRR        RRR   000          000
MMM MMM MMM MMM   AAA      AAA   CCC             RRR        RRR   000          000
MMM  MMM MMM MMM  AAA      AAA   CCC             RRR        RRR   000          000
MMM  MMM MMM MMM  AAA      AAA   CCC             RRR        RRR   000          000
MMM        MMM    AAA      AAA   CCC             RRRRRRRRRRR      000          000
MMM        MMM    AAA      AAA   CCC             RRRRRRRRRRR      000          000
MMM        MMM   AAAAAAAAAAAAAA  CCC             RRR    RRR       000          000
MMM        MMM   AAAAAAAAAAAAAA  CCC             RRR     RRR      000          000
MMM        MMM   AAAAAAAAAAAAAA  CCC             RRR      RRR     000          000
MMM        MMM    AAA      AAA   CCC             RRR       RRR    000          000
MMM        MMM    AAA      AAA   CCC             RRR        RRR   000          000
MMM        MMM    AAA      AAA   CCC             RRR        RRR   000          000
MMM        MMM    AAA      AAA       CCCCCCCCCCC  RRR        RRR      000000000
MMM        MMM    AAA      AAA       CCCCCCCCCCC  RRR        RRR      000000000
MMM        MMM    AAA      AAA       CCCCCCCCCCC  RRR        RRR      000000000
```

FILEID**CRFMACROS

```
CCCCCCC  RRRRRRR   FFFFFFFFF  MM    MM  AAAAAA    CCCCCCC  RRRRRRR    000000    SSSSSSSS
CCCCCCC  RRRRRRR   FFFFFFFFF  MM    MM  AAAAAA    CCCCCCC  RRRRRRR    000000    SSSSSSSS
CC       RR    RR  FF         MMMM MMMM  AA    AA  CC       RR    RR  00    00  SS
CC       RR    RR  FF         MMMM MMMM  AA    AA  CC       RR    RR  00    00  SS
CC       RR    RR  FF         MM MM MM   AA    AA  CC       RR    RR  00    00  SS
CC       RR    RR  FF         MM    MM   AA    AA  CC       RR    RR  00    00  SS
CC       RRRRRRR   FFFFFFFF   MM    MM   AA    AA  CC       RRRRRRR   00    00  SSSSSS
CC       RRRRRRR   FFFFFFFF   MM    MM   AA    AA  CC       RRRRRRR   00    00  SSSSSS
CC       RR  RR    FF         MM    MM   AAAAAAAAAA CC      RR  RR    00    00        SS
CC       RR  RR    FF         MM    MM   AAAAAAAAAA CC      RR  RR    00    00        SS
CC       RR   RR   FF         MM    MM   AA    AA  CC       RR   RR   00    00        SS
CC       RR    RR  FF         MM    MM   AA    AA  CC       RR    RR  00    00        SS
CCCCCCC  RR    RR  FF         MM    MM   AA    AA  CCCCCCC  RR    RR    000000    SSSSSSSS
CCCCCCC  RR    RR  FF         MM    MM   AA    AA  CCCCCCC  RR    RR    000000    SSSSSSSS

MM    MM  AAAAAA    RRRRRRR
MM    MM  AAAAAA    RRRRRRR
MMMM MMMM AA    AA  RR    RR
MMMM MMMM AA    AA  RR    RR
MM MM MM  AA    AA  RR    RR
MM MM MM  AA    AA  RR    RR
MM    MM  AA    AA  RRRRRRR
MM    MM  AA    AA  RRRRRRR
MM    MM  AAAAAAAAAA RR  RR
MM    MM  AAAAAAAAAA RR  RR
MM    MM  AA    AA  RR   RR
MM    MM  AA    AA  RR   RR
MM    MM  AA    AA  RR    RR
MM    MM  AA    AA  RR    RR
```

```
DEF

MNB
MNB
MNB
MNB
MNB
MNB

:  M
:
.=0

MAB
MAB
MAB
MAB
MAB
MAB

:  M
:
.=0

MXB
MXB
MXB
```

```
        .TITLE  CRF_MACROS
        .IDENT  'V04-000'
```

```
;++
; FACILITY:  CROSS REFERENCE PROGRAM

; ABSTRACT:  ACCEPTS CROSS REFERENCE DATA AND PRODUCES A SUMMARY

; ENVIRONMENT: LINKABLE IMAGE TO BE USED WITH THE NATIVE MODE LINKER AND COMPILERS

; AUTHOR: K.D. MORSE   , CREATION DATE:  12-APR-77

; MODIFIED BY:

;  01    _  : VERSION
;--
```

```
        .SBTTL  DECLARATIONS
; INCLUDE FILES:
;
;
;
; MACROS:
;
;
;
; MACRO TO INITIALIZE THE OUTPUT LINE DESCRIPTION TABLE
;
; $CRFCONTROLTBL          OUT_RTN,ERR_RTN,KEY_TYPE,KEY1TABLE,KEY2TABLE,-
;                         VAL1TABLE,VAL2TABLE,REF1TABLE,REF2TABLE
;
; WHERE
;
;       ERR_RTN = ADDRESS OF USER'S ERROR ROUTINE
;       OUT_RTN = ADDRESS OF USER'S OUTPUT ROUTINE
;       KEY_TYPE = TYPE OF KEY, 0=ASCIC, 1=BINARY LONGWORD
;       KEY1TABLE = ADDRESS OF KEY1 FIELD DESCRIPTION TABLE
;       KEY2TABLE = ADDRESS OF KEY2 FIELD DESCRIPTION TABLE
;       VAL1TABLE = ADDRESS OF VAL1 FIELD DESCRIPTION TABLE
;       VAL2TABLE = ADDRESS OF VAL2 FIELD DESCRIPTION TABLE
;       REF1TABLE = ADDRESS OF REF1 FIELD DESCRIPTION TABLE
;       REF2TABLE = ADDRESS OF REF2 FIELD DESCRIPTION TABLE
;
        .MACRO  $CRFCONTROLTBL  OUT_RTN,ERR_RTN,KEY_TYPE=0,KEY1TABLE,-
                                KEY2TABLE,VAL1TABLE,VAL2TABLE,REF1TABLE,-
                                REF2TABLE

        .LONG   0                               ; TREE LISTHEAD-ROOT
        .WORD   CRF$K_ENTSIZE                   ; SIZE OF ONE CRF ENTRY
        .WORD   CRF$K_NODSIZE                   ; SIZE OF ONE CRF NODE
        .BYTE   KEY_TYPE                        ; TYPE OF KEY
        .BYTE   0                               ; CRF FLAGS
        .WORD   0                               ; SECONDARY ERROR STATUS CODE
        .LONG   ERR_RTN                         ; ADDR OF ERROR ROUTINE
        .LONG   OUT_RTN                         ; ADDR OF OUTPUT ROUTINE
                                                ; ADDRESSES OF FIELD DESCRIPTIONS
        .LONG   KEY1TABLE                       ; KEY1 FIELD DESCRIPTIONS
        .LONG   KEY2TABLE                       ; KEY2 FIELD DESCRIPTIONS
        .LONG   VAL1TABLE                       ; VAL1 FIELD DESCRIPTIONS
        .LONG   VAL2TABLE                       ; VAL2 FIELD DESCRIPTIONS
        .LONG   REF1TABLE                       ; REF1 FIELD DESCRIPTIONS
        .LONG   REF2TABLE                       ; REF2 FIELD DESCRIPTION
        .ENDM                                   ; END OF INIT MACRO


; MACRO TO DEFINE ONE FIELD OF THE OUTPUT LINE
;
; $CRFFIELD       BIT_MASK,FAO_STRING,FIELD_WIDTH,SET_CLEAR
;
; WHERE:
;
```

```
;       BIT_MASK=MASK OF BITS INDICATING THIS OUTPUT DESCRIPTION HOLDS
;       FAO_STRING=FAO CONTROL STRING FOR THIS FIELD
;       FIELD_WIDTH=MAXIMUM SIZE OF THIS OUTPUT LINE FIELD
;       SET_CLEAR=INDICATOR HOW TO TEST MASK BITS, I.E. ONE OF THE FOLLOWING:
;               SET=MASK BITS ARE TO BE TESTED AS SET
;               CLEAR=MASK BITS ARE TO BE TESTED AS CLEAR
;

        .MACRO  $CRFFIELD       BIT_MASK=0,FAO_STRING,FIELD_WIDTH,SET_CLEAR

        .SAVE                                   ; REMEMBER USER'S PSECT
        .PSECT  $$CRFSTRNG,RD,WRT,REL,NOEXE,NOSHR
$$$LNG1=.                                       ; ADDRESS OF FAO CONTROL STRING
        .ASCII  \FAO_STRING\                    ; OUTPUT FIELD CONTROL STRING
$$$LNG2=.                                       ; INDICATOR FOR LENGTH

        .RESTORE                                ; RESTORE USER'S PSECT
        .WORD   BIT_MASK!^X8000                 ; RECORD MASK BITS

        .IF     IDN     <SET_CLEAR>,<CLEAR>     ; DETERMINE WHETHER
        .BYTE   0                               ; MASK IS TO BE CLEAR
        .IFF                                    ; OR IF
        .BYTE   1                               ; MASK IS TO BE SET
        .ENDC                                   ;

        .BYTE   FIELD_WIDTH                     ; MAXIMUM SIZE OF FIELD

        .LONG   $$$LNG2-$$$LNG1                 ; STRING DESCRIPTOR
        .LONG   $$$LNG1                         ; FOR FAO CONTROL STRING

        .ENDM                                   ; END OF FIELD DESCRIPTION MACRO

; MACRO TO INDICATE END OF OUTPUT LINE DESCRIPTION TABLE
;
; $CRFFIELDEND
;
; WHERE:
;
;       THERE ARE NO FORMAL PARAMETERS.
;

        .MACRO  $CRFFIELDEND                    ;

        .WORD   0                               ; END FIELD DESCRIPTIONS

        .ENDM                                   ; END OF MACRO
```